Remarks

Rejection Under 35 U.S.C. § 112, second paragraph

Claims 1-3, 5, 6, 8-10, 12, and 15-20 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicants respectfully traverse this rejection.

The Legal Standard

The test for definiteness under 35 U.S.C. § 112, second paragraph, is whether "those skilled in the art would understand what is claimed when the claim is read in light of the specification." *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986). The fact that other language may be used in a claim is not a valid basis for a rejection under 35 U.S.C. § 112, second paragraph. The M.P.E.P. explains that the examiner's focus during examination of claims for compliance with the definiteness requirement "is whether the claim meets the threshold requirements of clarity and precision, *not whether more suitable language or modes of expression are available*." (M.P.E.P. 2173.02, emphasis added) The M.P.E.P. further explains that "[s]ome latitude in the manner of expression and the aptness of terms should be permitted even though the claim language is not as precise as the examiner might desire." (*Id.*)

Analysis

One of skill in the art would understand the phrase "non-interactive"

The specification states that "non-interactive" indicates that the polymer does not interact or bind with metal oxide surfaces. (see page 8, lines 16-17). The specification provides a list of

representative non-interactive polymers, including polyalkylene oxides, neutral water soluble polysaccharaides, polyvinyl alcohol, poly-N-vinyl pyrrolidone, etc. (*see* page 8, lines 17-27). Independent claims 1, 12 and 15, as amended, specify that the polyionic backbone of the copolymer adsorbs onto the charged surface. Support for this amendment can be found in the specification at least at page 10, line 2 and in Figure 2. Further, as noted in the specification, the non-interactive side chains generally extend away from the charged surface (see Figure 2 and page 10, line 3). Therefore one of ordinary skill in the art would understand that the "non interactive" polymer side chains in the graft copolymer are side chains that do not interact or bind with charged surfaces, such as metal oxide surfaces. Therefore claims 1-3, 5, 6, 8-10, 12, and 15-20 are definite.

Rejections Under 35 U.S.C. § 102/103

Claims 1-3, 5, 6, 8, 9, 12, and 15-20 were rejected under 35 U.S.C. § 102(e) as being anticipated by, or in the alternative under 35 U.S.C. § 103(a) as being obvious over, U.S. Publication No. 2003/008711 to Hubbell *et al.* ("Hubbell"). Claims 1-3, 5, 6, 8, 9, 12, and 15-20 were rejected under 35 U.S.C. § 102(e) as being anticipated by, or in the alternative under 35 U.S.C. § 103(a) as being obvious over, U.S. Publication No. 2002/0143081 to Li *et al.* ("Li"). Claims 1-3, 5, 6, 8, 9, 12, and 15-20 were rejected under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative under 35 U.S.C. § 103(a) as being obvious over, WO 00/65352 to Textor *et al.* ("Textor"). Applicants respectfully traverse this rejection.

The claimed methods and sliding surfaces

Independent claims 1 and 12 have been amended. Claim 1, as amended, defines a method for lubricating two sliding surfaces, where at least one surface is a charged surface, and requires the step of administering a lubricating composition between the two surfaces. Claim 12, as amended, defines two sliding surfaces, where at least one surface is a lubricated surface, containing a charged surface and a lubricating composition. Support for these amendments can be found in the specification at least at page 9, line 30 until page 10, line 1. The independent claims further specify that the lubricating composition contains a graft copolymer with a polyionic backbone and non-interactive side chains and an aqueous medium, and that the polyionic backbone adsorbs onto the charged surface. Further the independent claim specify that the lubricated surface has a lower friction coefficient between the lubricated surface and the second sliding surface than the friction coefficient between the charged surface and the second sliding surface in the absence of the lubricating composition.

As discussed in detail below, none of the references cited by the Examiner disclose or suggest methods for reducing the coefficient of friction between two sliding surfaces or the resulting sliding surfaces.

Hubbell

Hubbell discloses compositions for coating biological and non-biological surfaces to minimize or prevent cell-cell contact and tissue adhesion. The compositions contain polyethylene glycol (PEG)/polylysine (PLL) copolymers (abstract). Hubbell does not disclose or

suggest compositions or methods for use between two sliding surfaces. For example, with respect to coating non-biological surfaces, Hubbell indicates that these surfaces are "intended to be placed in contact with a biological environment." (para. 0089) Hubbell does not disclose or suggest two sliding surfaces (i.e. surfaces in contact with each other) where at least one of the surfaces is a lubricated surface, as defined by claim 12, as amended. Further, with respect to the method claims, Hubbell applies the coating to one surface, such as the surface of a device (see para. 0094 and 0095). In contrast, independent claim 1, as amended, specifies that the lubricating composition is placed between two sliding surfaces. Therefore claims 1-3, 5, 6, 8, 9, 12, and 16-18, as amended, are novel in view of Hubbell.

Additionally, Hubbell does not suggest modifying its method or coating to place a lubricating composition between two sliding surfaces. Hubbell is directed at preventing fouling on the surface of a device, i.e. preventing the adsorption of a protein layer on the surface of the device when the device is in contact with biological fluids (see para. 0092). Hubbell contains no disclosure relating to how to reduce the friction coefficient between two sliding surfaces. One of ordinary skill in the art would not be motivated to modify Hubbell's method of applying a coating and the resulting coated surfaces to practice the claimed method for lubricating two sliding surfaces and to form the claimed sliding surfaces. Therefore claims 1-3, 5, 6, 8, 9, 12, and 16-18, as amended, are non-obvious in view of Hubbell.

Li

Li discloses amphiphilic latex nanoparticles containing a core and a shell, where the core contains a hydrophobic vinylic grafted copolymer and hydrophobic vinylic homopolymer and the shell is a hydrophilic, nitrogen containing polymer (abstract). Li describes a method for the graft copolymerization of a vinylic monomer onto a nitrogen-containing water soluble polymer in water or another aqueous system (para. 0016). Li's copolymers do not contain a polyionic backbone, instead Li discloses that the sidechains may be charged water soluble polymers, such as polyethylene imine (PEI) (*see* Figure 1 and abstract). Therefore Li's copolymer is structurally different from the copolymer that is contained in the lubricating composition. Further, Li does not describe adsorbing the copolymer onto a charged surface. Finally, as discussed above with respect to Hubbell, Li does not disclose placing its copolymer between two sliding surfaces. Therefore, claims 1-3, 5, 6, 8, 9, 12, and 16-18, as amended, are novel in view of Li.

Further, Li does not disclose or suggest modifying its copolymer so that the copolymer has a polyionic backbone and non-interactive sidechains. Li focuses on forming well-defined core-shell nanoparticles, and Li's method is specifically directed to forming graft copolymers having this particular structure (*see* para. 0003, last sentence; and para. 0014). Additionally, Li does not suggest placing a lubricating composition between two sliding surfaces. Li is directed at using its nanoparticles for targeted drug delivery (para. 0146-0148), diagnostic tests (para 0149-0150), agglutination tests (para. 0151-0152), gene delivery (para. 0153-0154), water treatment applications (para. 0155-0156), and forming coating for leather finishing, paints, paper

and textile industries (para. 0158). Li contains no disclosure relating to how to reduce the friction coefficient between two sliding surfaces. One of ordinary skill in the art would not be motivated to modify Li's uses for the copolymers to practice the claimed method for lubricating two sliding surfaces and to form the claimed sliding surfaces. Therefore claims 1-3, 5, 6, 8, 9, 12, and 16-18, as amended, are non-obvious in view of Li.

Textor

Textor discloses methods for making improved analytical and biosensing devices, such devices, and uses for these devices. A copolymer, which contains a charged portion and non-interactive side chains, is coated or applied onto the surface of the analytical or biosensing device. The charged portion of the copolymer adsorbs onto the surface, while the non-interactive side chains form a dense structure that prevents the adsorption of molecules or ions onto the surface, making the surface resistant to non-specific adsorption of proteins. Textor does not disclose applying the copolymer between two sliding surfaces, as required by claim 1, as amended. Further Textor does not disclose sliding surfaces where at least one of the surfaces is a lubricated surface, as required by claim 12, as amended. Therefore 1-3, 5, 6, 8, 9, 12, and 16-18, as amended, are novel in view of Textor.

Further, Textor does not suggest modifying its method or coatings to place a lubricating composition between two sliding surfaces. Textor is directed at preventing non-specific adsorption on the surface of an analytical or sensing device. Textor contains no disclosure relating to how to reduce the friction coefficient between two sliding surfaces. One of ordinary

skill in the art would not be motivated to modify method of making an analytical or sensing device and the resulting devices of Textor to practice the claimed method for lubricating two sliding surfaces and to form the claimed sliding surfaces. Therefore claims 1-3, 5, 6, 8, 9, 12, and 16-18, as amended, are non-obvious in view of Textor.

Rejection Under 35 U.S.C. § 103

Claims 9 and 10 were rejected under 35 U.S.C. § 103(a) as being obvious over Hubbell, in view of U.S. Publication No. 20010049105 to Singh *et al.* ("Singh"). Claim 10 was rejected under 35 U.S.C. § 103(a) as being obvious over Textor in view of Singh. Applicants respectfully traverse this rejection to the extent that it is applied to the claims as amended.

Hubbell in view of Singh

Claims 9 and 10 depend from claim 1, which is discussed above. As noted above, Hubbell is directed at preventing fouling on the surface of a device, i.e. preventing the adsorption of a protein layer on the surface of the device when the device is in contact with biological fluids (see para. 0092). Hubbell contains no disclosure relating to how to reduce the friction coefficient between two sliding surfaces. Singh does not make up for the deficiencies of Hubbell. Singh discloses probe sets for the detection of binding of or interaction between one or more ligands by releasing identifying tags when such target recognition occurs (abstract). Singh is relied on by the Examiner solely for the disclosure that biotin may be used as a receptor ligand. Singh does not disclose or suggest placing a lubricating composition between two sliding surfaces. Therefore the combination of Hubbell with Singh would not make claims 9 and 10 obvious.

Textor in view of Singh

Claim 10 depends from claim 1, which is discussed above. As noted above, Textor is directed at preventing non-specific adsorption on the surface of an analytical or sensing device. Textor contains no disclosure relating to how to reduce the friction coefficient between two sliding surfaces. Singh does not make up for the deficiencies of Textor. Singh discloses probe sets for the detection of binding of or interaction between one or more ligands by releasing identifying tags when such target recognition occurs (abstract). Singh is relied on by the Examiner solely for the disclosure that biotin may be used as a receptor ligand. Singh does not disclose or suggest placing a lubricating composition between two sliding surfaces. Therefore the combination of Textor with Singh would not make claim 10 obvious.

Additional Amendments to the claims

Claims 15, 19 and 20 have been canceled as being duplicative of claims 1, 16, and 3, respectively.

Allowance of claims 1-14 and 16-18, as amended, is respectfully solicited.

Respectfully submitted,

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